Case Report

Rapid Cystic Development in Relation With an Impacted Lower Third Molar: A Case Report

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Abstract

Cystic changes can arise in relation with unerupted lower third molars. This case report describes a large odontogenic keratocyst (OKC) which developed rapidly and aggressively over a short period of 2 years and presented with acute symptoms. The development of a large OKC over the mandible is evidenced by radiographs taken 2 years apart. The OKC was enucleated and the residual cavity was treated with Carnoy's solution and packed with bismuth iodoform paraffin paste dressing. The impacted third molar and second molar associated with the lesion were also extracted. This case illustrates how rapidly a cyst can develop in association with a previously asymptomatic, unerupted tooth and how quickly a radiographic diagnosis can become out of date. As such, the authors recommend the use of repeated radiographs for monitoring unerupted teeth at a tighter time frame of 6 to 12 months.

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Introduction

There are many conditions affecting the jaws that present with a cystic, radiographic appearance. Odontogenic cysts and tumours have the potential to reach considerable sizes in the jaw. Unicystic ameloblastoma often presents as a large unilocular radiolucency in young individuals, typically at the posterior mandible, and is usually associated with an impacted tooth. Radiographically, the lesion also exhibits minimal peripheral sclerosis. Over 80% of these cystic tumours enclose the crown of a tooth and mimic dentigerous cysts radiographically.[1] The roots of the adjacent teeth are usually resorbed. The possibility of an ameloblastoma at the angle of the mandible should not be dismissed until the diagnosis is confirmed by biopsy.

Odontogenic keratocysts (OKCs) arise from the remnant cells of the dental lamina and form intraosseously, most frequently in the ramus or third molar region of the mandible. An OKC can initially present radiographically as a unilocular radiolucency, and large lesions exhibit multilocular appearance, often with densely corticated margins. Occasionally, a keratocyst may envelope an unerupted tooth and be indistinguishable radiographically from a dentigerous cyst. Adjacent teeth may become displaced. There is a high recurrence rate of up to 60% after enucleation. Hence, a fixative, such as Carnoy's solution, is used following enucleation to reduce recurrence.

Fig. 1. A dental panoramic tomogram taken 2 years ago.

A dentigerous cyst envelopes the crown of an impacted tooth and its epithelial lining is derived from enamel epithelium. The cyst is attached to the tooth at the amelodentinal junction, prevents its eruption and may displace it for a considerable distance. The cyst cavity is well-circumscribed and is usually unilocular. It is treated by enucleation and recurrence is uncommon.

Case Report

A 22-year-old Chinese female presented with pain and

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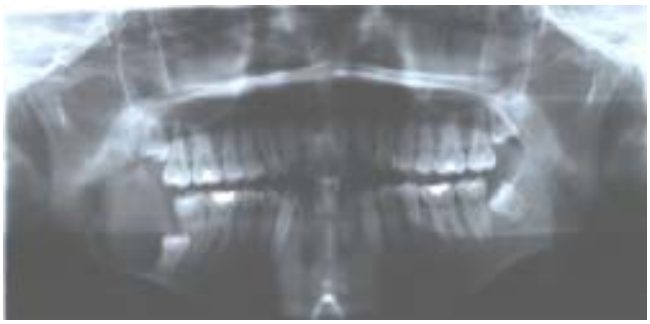

Fig. 2. Preoperative dental panoramic tomogram.

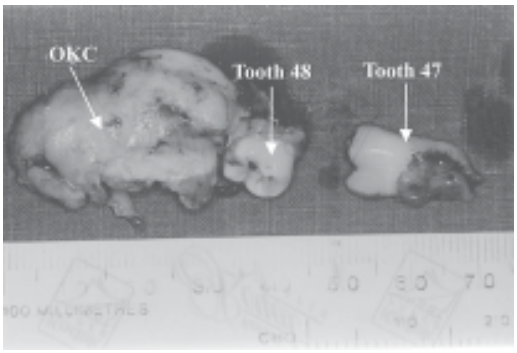

Fig. 3. Enucleated odontogenic keratocyst attached to the tooth 48, and the tooth 47.

swelling over the lower right molar region. There was pain during chewing and on mouth opening. Both the upper and lower right third molars were not clinically seen. The patient had not suffered any previous episodes of pericoronitis on the right side and her medical history was unremarkable.

A dental panoramic tomograph taken 2 years ago revealed mesio-angular impacted lower left and right third molars with no apparent lesion or radiolucency on the right side of the mandible (Fig. 1). Clinically, the lower right second molar was tender to percussion, and there were deep probing pockets (about 8 mm) localised to the buccal aspect of the tooth. There was mild swelling of the buccal mucosa and a sinus tract was noted. Electric pulp test and cold test showed that the tooth was still vital. These findings were consistent with the diagnosis of an acute periodontal abscess. A periapical radiograph was taken and there was bone loss distal to tooth #47; no periapical lesion was noted. The third molar was mesio-angularly impacted against the distal root of the second molar. The immediate treatment was root planning under local anaesthesia.

Review of the patient 4 days later showed that the sinus and swelling on the buccal mucosa had resolved. However, the lower second right molar was still tender to percussion, and the deep probing depths persisted. The patient still experienced pain on chewing on the right side and on opening mouth. Thus, she was referred to the Oral and Maxillofacial Surgery Clinic.

A dental panoramic tomograph was taken and revealed a 5 x 3-cm oval, unilocular and well-circumscribed radiolucency posterior to the third molar and extending from the angle of the mandible to the ascending ramus (Fig. 2).

After consultation with the patient and her family, it was decided to perform an incisional biopsy to confirm the diagnosis followed by definitive treatment.

With the patient under local anaesthesia and sedation, a buccal flap was raised at the region of the lower right third molar region. A bony window was created. A cystic cavity filled with pus was noted. There was no evidence of a solid lesion. The pus was aspirated. A 10 x 10-mm cystic lining was excised for histopathologic examination.

Fig. 4. A dental panoramic tomogram taken at 9 months post-operation.

Histological sections of the cyst lining showed part of a cyst comprising a fibrous connective tissue wall with epithelial lining. The fibrous tissue wall demonstrated chronic inflammatory infiltrate and the epithelial lining consisted of an uniformly thin, keratinising stratified squamous epithelium with a well-defined basal cell layer. Histology was consistent with an OKC with inflammation in one area.

With the patient under general anaesthesia, a buccal flap was raised to expose the OKC. A bony window was created. The OKC was enucleated and the impacted third molar was removed along with the second molar. Figure 3 shows the enucleated odontogenic keratocyst attached to the associated tooth. Curettage was performed to remove any remnants of cystic tissue. Care was taken to preserve the inferior alveolar nerve.

The cavity was treated with Carnoy's solution for about 5 minutes before it was flushed out with copious amounts of saline. Carnoy's solution comprises mainly absolute alcohol, chloroform and glacial acetic acid. It has excellent

penetration and is a fast-acting fixative. Bismuth iodoform paraffin paste (BIPP) dressing was placed in the cystic cavity, and the soft tissues were closed to allow healing by secondary intention. The surgical site healed without complications. The BIPP dressing was replaced by a smaller one on every subsequent third week. Figure 4 shows the dental panoramic tomogram taken at 9 months postoperatively.

Discussion

A cyst is a pathological cavity containing fluid or semi-fluid contents, which has not been formed by the accumulation of pus. Cysts of the jaws are more common than in any other bone, and the majority are lined completely or in part by epithelium.[1] Cysts constitute about 17% of the tissue specimens submitted to the Oral Pathology Biopsy Services. The periapical cyst is the most common odontogenic cyst (52.3% to 70.7% of all odontogenic cysts) followed by the dentigerous cyst (16.6% to 21.3% of all odontogenic cysts) and OKCs (5.4% to 17.2% of all odontogenic cysts).[2,3] According to the latest World Health Organization classification, the OKC is classified as a developmental, non-inflammatory odontogenic cyst that arises from the cell rests of dental lamina.[4]

OKCs are believed to arise from the dental lamina or its remnants.[4] The epithelial rests or glands of Serres persisting after dissolution of the dental lamina give rise to OKCs. Histologically, OKCs consist of a thin, band-like lining of stratified squamous epithelium with a spinous cell layer about 5 to 8 cells thick and a corrugated parakeratinised luminal layer, and a thin, inflammation-free connective tissue capsule. It is characterised by an uniform epithelial layer that lacks rete ridges.

The common radiographic features are unilocular or multilocular well-circumscribed radiolucent lesions surrounded by a thin sclerotic border. Keratocysts can be located at the periapical region of teeth, thus resembling periapical cysts; or they may envelope the crowns of unerupted teeth, mimicking dentigerous cysts;[5,6] or they can be sited between the roots of the teeth, simulating lateral periodontal cysts or lateral radicular cysts;[7] or they can be located at the maxillary midline, suggestive of a nasopalatine duct cyst.[8] Radiographically, large OKCs in the mandible can be indistinguishable from cystic ameloblastomas.[9,10] Conventional radiographic imaging, such as panoramic views and intraoral periapical films, are usually adequate to determine the location and estimate the size of an OKC. With larger lesions, computed tomography scans are required. In envelopmental keratocysts and follicular keratocysts, the radiographic images can resemble that of a dentigerous cyst.[1] Occasionally, the lining of a cyst in a true dentigerous relationship may be identified as a keratocyst. This concept has been developed by Altini and Cohen[11] who have introduced the term "follicular primordial cyst" (follicular keratocyst) for this entity. They postulated that follicular keratocysts might arise following eruption of a tooth into a pre-existing keratocyst cavity in the same way a tooth erupts into the oral cavity. A biopsy is mandatory to distinguish between OKCs, cystic ameloblastomas and dentigerous cysts in cases of large cystic lesions.

Patients in their second and third decades of life are affected most commonly. Several studies have shown that the mandible is involved more often than the maxilla, and the posterior part of the mandible is the most common site for OKCs.[12-14] It has been reported in many studies that the recurrence rate of OKC following enucleation is higher than other odontogenic cysts.[4,15] OKC is an aggressive cystic lesion that has a propensity for recurrence if not adequately removed. Numerous published reports have shown recurrence rates ranging from 3% to 60%.[16]

With OKCs' aggressive and invasive nature with a predilection for recurrence, some researchers had proposed that it might be a benign neoplasm rather than a cystic lesion.[17] Many investigations have been undertaken to identify the molecular characteristics that contribute to and determine the behaviour of OKC. Toller proposed that raised osmolalities may have played a part in the expansive increase in size of keratocysts,[18] while an alternative view was that mural growth in the form of epithelial proliferations was the main process involved in the enlargement.[19] It was believed that the multilocular and loculated outlines exhibited by some OKCs were suggestive of a multicentric pattern of cyst growth brought about by the proliferation of local groups of epithelial cells against the semi-solid cyst contents.[20] The infolding of the epithelial lining into the cyst capsule suggests that this was the result of active epithelial proliferation.[21] Other clinical studies have also reported the behaviour of some OKCs to be as aggressive as benign neoplasms, such as an ameloblastoma.[17] There is, however, not much information on their rate of growth. It had been noted that OKCs tend to extend along the cancellous component of the bone without producing extensive expansion of the cortical plates and they frequently reached a large size, particularly at the angle of the mandible and ascending ramus, before they were diagnosed.

Treatment options include surgical resection of the mandible or surgical enucleation with curettage. Due to the high recurrence rate of OKCs following enucleation, the use of Carnoy's solution to fix the surrounding tissue and any cystic remnants has been recommended. Voorsmit et al[22] reported the results of two groups of patients treated for keratocysts. In the first group of 59 cases treated from 1959 to 1980, the cysts were treated conservatively by careful enucleation of the entire wall. In the second group of 40

cases treated between 1970 and 1980, the cysts were removed by enucleation, along with excision of the mucosa overlying any perforation of the cortical bone and followed by treatment of the cystic cavity with Carnoy's solution. The recurrence rate in the first group was 13.5% over 1 to 21 years of follow-up, while that in the second group was 2.5% over 1 to 10 years of follow-up.

Conclusion

The lesion described in this case report illustrates that cystic changes in relation to an impacted lower third molar can develop over a relatively short period of time. Although the repetition of radiographs for monitoring of asymptomatic, unerupted teeth is a controversial issue, when symptoms do arise, an up-to-date radiograph is justified and would be most helpful in the detection of any underlying pathology. The authors recommend the use of repeated radiographs for monitoring asymptomatic unerupted teeth at a tighter time frame of 6 to 12 months.

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